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CONTENTS

ORIGINAL ARTICLES

THE SPECIFIC TREATMENT OF TYPHOID FEVER.
By William Royal Stokes, M.D., Baltimore, and *H. W. Maldeis, M.D.,* Baltimore.

WHAT IS INFLUENZA? *By Major George A. Soper, S.C., U.S.A.,* Washington, D. C.

CLINICAL DEPARTMENT

CASE REPORT: TRANSPOSITION OF VISCERA, TERTIARY SYPHILIS.
By C. Guy Lane, M.D., Boston.

EDITORIALS

ACTIVITIES OF A MEDICAL COLLEGE.

DR. SHATTUCK ASSUMES RED CROSS POST.

For complete table of contents, see first text page.

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TABLE OF CONTENTS

November 27, 1919

ORIGINAL ARTICLES

THE SPECIFIC TREATMENT OF TYPHOID FEVER. *By William Royal Stokes, M.D., Sc.D.*, Baltimore, and *H. W. Maldeis, M.D.*, Baltimore. 625

WHAT IS INFLUENZA? *By Major George A. Soper, S.C., U.S.A.*, Washington, D.C. 635

CLINICAL DEPARTMENT

CASE REPORT: TRANSPOSITION OF VISCERA, TERTIARY SYPHILIS. *By C. Guy Lane, M.D.*, Boston. 641

BOOK REVIEWS

The Surgical Clinics of Chicago. 643

Physiology for Nurses. By W. G. Christian, M.D., and C. C. Haskell, M.D. 643

Hygiene for Nurses. By Nolie Mumey, M.D. 643

Nursing in Diseases of Children. By Carl G. Lee-Wolf, M.D. 643

A Laboratory Manual for Elementary Zoölogy. By L H. Hyman. 643

The Soul in Suffering. By Robert S. Carroll. 644

Electricity in Medicine. By George W. Jacoby, M.D., and J. Ralph Jacoby, M.D. 644

EDITORIALS

ACTIVITIES OF A MEDICAL COLLEGE. 645

DR. SHATTUCK ASSUMES RED CROSS POST. 646

MEDICAL NOTES. 646

OBITUARIES

HENRY KEMBLE OLIVER, M.D. 647

AUGUST HOCH, M.D. 649

CORRESPONDENCE

SUCCESSFUL RESECTION OF THE INTESTINE IN 1826. *S. B. Woodward* 650

MISCELLANY

NOTICES, RECENT DEATHS, ETC. 650

Original Articles.

THE SPECIFIC TREATMENT OF TYPHOID FEVER.*

BY WILLIAM ROYAL STOKES, M.D., SC.D.,

AND

H. W. MALDEIS, M.D., BALTIMORE, MD.

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THE first attempt to establish a specific therapy for typhoid fever was made by E. Fraenkel[1] in 1893. He treated 57 cases with intramuscular injections of killed thymus bouillon cultures of the typhoid bacillus. He began with a dose of 0.5 of a c.c., followed by 1 c.c. in 24 hours. These injections often caused a marked drop in the temperature but in two days the temperature often rose again, and an injection of 2 c.c. was often necessary to cause a second and permanent drop which soon reached normal. The treatment also caused a distinct change in the general condition, the diarrhea ceased, and apyrexia usually was attained in from 14 to 16 days.

In 1902 Petruschy[2] used small doses of dead typhoid organisms combined with typhoid immune serum. He began with a dose of 0.05 c.c. and using two injections daily for three days he ended with an injection of 0.3 c.c. He noted marked improvement in his cases, but gives no details concerning the number treated or the results obtained.

In 1908 Tescarolo and Quadrone[3] treated 20 cases of typhoid fever with living attenuated typhoid bacilli. These injections produced severe reactions but they reported favorable results. In 1909 Watters and Eaton[4] treated 30 cases with typhoid vaccine, and in the same year Smallman[5] treated 36 cases in the Indian army with favorable results.

During 1911 and 1912 a fair number of investigators reported the use of typhoid vaccine in the treatment of typhoid fever, and Callison[6] in the latter year reported a series of cases including 38 cases treated by himself. He used 500,000,000 and increased 100,000,000 at four-day intervals as long as required. His results in the main were favorable, and in a number of cases he obtained an early remission of the temperature and a rapid return to normal.

In 423 cases obtained from literature he found a mortality of 5.4% and 6.5% of relapses.

In March, 1915, Krumbhaar and Richardson[7] published a study of over 1800 cases in which typhoid vaccine had been used for the

* Read before the Research Club of Baltimore.

treatment of typhoid fever by about 40 observers, and they include in this description 93 cases which were treated by them or their associates. Their first series of 14 cases were treated with a stock typho-bacterin and the total dosage varied between 50,000,000 to 1,650,000,000 in from one to five doses, the average doses being 926,000,000 per patient. In the second series of 33 cases the vaccine was made from the Rawlings strain, the total doses varying between 200,000,000 and 1,450,000,000 bacteria per c.c. in from one to three doses. In their third series of 16 cases the total dosage ranged between 850,000,000 and 3,350,000,000 in from one to five doses, the average per patient being 1,640,000,000. In this entire series the percentage of deaths was 7.5, of relapses 5.3, and of complications 18.2. In 170 mild cases of typhoid not given vaccine during the same time there were 14 deaths, 16 relapses, and 18 complications, showing respectively a percentage of 8.02, 9.2, and 10.6 for the deaths, relapses, and complications in the untreated cases.

Three deaths in the first series of cases were due to complications of meningitis in one case and perforation in two cases. Two deaths in the second series of cases were due to complicating pneumonia. The authors seem to think that these deaths put the cases beyond the influence of the vaccine, but as all statistics in untreated cases are based upon deaths from complications as well as the straight disease, it would hardly seem fair to reduce their percentage by omitting these cases.

Even including these cases the mortality was reduced to 7.5% as compared to the generally acknowledged mortality of about 10% in cases not treated by vaccine.

The only way to gain a correct idea of the results of any specific treatment in typhoid fever is to study a large number of treated cases, and Krumbhaar and Richardson have made a compilation of 1806 cases. The individual dose varied from 10,000,000 to 1,500,000,000 bacteria per c.c. but the average dose in a large percentage of cases seemed to be about 500,000,000. Two observers who treated only 39 of the total number of cases did not observe the difference between treated and untreated cases, but in the other 95% of cases treated the results were reported as distinctly favorable. In the total number of 1806 cases there were 99 deaths, a percentage of 5.4, and this contrasts favorably with the 10% for untreated cases. There were 88 relapses, a percentage of 4.8, and this percentage compares favorably with the 8.8 percentage of relapses given by Osler from a study of 28,057 collected cases.

An analysis of the various cases treated by Krumbhaar and Richardson also shows a number of interesting results. In the first series five cases treated before the tenth day dropped to normal in nine, eleven, fifteen, seventeen and seventeen days, and in the second series a few cases treated early in the disease showed a return to normal in from fifteen to seventeen days. Most of this series were treated later in the disease and but few favorable results were obtained. In the third series of cases large doses were given early in the disease. In several cases in which initial doses of 250,000,000 to 300,000,000 were given, followed by 500,000,000, 600,000,000, 700,000,000 800,000,000, and 1,000,000,000 doses, usually with three or four injections to each case, the temperature reached normal in from 14 to 19 days, the first dose being administered on the sixth to the fourteenth day of the disease.

DOSAGE.

The best rule of dosage would seem to be that adopted by the above mentioned authors. They recommend for an adult an initial subcutaneous dose of 500,000,000 to be followed by two or more larger doses at three-day intervals. The unit for dosage is 150 pounds, and children should be given proportionate doses according to their weight. The treatment should not be used in moribund or late very toxic cases, or during hemorrhage or suspected perforation.

As a general rule the larger the dose the better the results obtained. When only from 1,000,000 to 2,000,000 bacteria were used there were 14 deaths in 92 cases, whereas from one to three doses of 1,000,000,000 to 1,500,000,000 there was only one death in 42 cases. It is important to institute the treatment early in the disease, as MacArthur[8] in his 63 treated cases got 3.1% of deaths, 3.1% of relapses, and 7.9% of complications, all occurring, however, in the 29 cases vaccinated in the unfavorable stage after the tenth day.

In spite of the general opinion that large doses are necessary for good results Petrovitch[9]

reported a reduction of the mortality of 460 treated cases to 3.2% as compared with an 8% fatality of 220 unvaccinated cases. He used from one to three doses of only 20,000,000 bacteria per c.c.

Horner[10] treated 40 cases of typhoid fever with vaccine and compared these with 95 cases in which vaccine was not used for the treatment. The initial dose was 10,000,000 and this was increased daily by 10,000,000 for one week; then on alternate days a 20,000,000 increase was used until the temperature remained normal for three days or the patient had received 700,000,000 dead typhoid bacilli. The inoculations were subcutaneous and produced no systemic reaction. The mortality was 10% for the vaccinated cases and 11.5% for the unvaccinated cases, and complications occurred in 55% of vaccinated cases and 50% of unvaccinated cases. In the uncomplicated vaccinated cases the fever lasted 24.39 days and in the unvaccinated cases 23.08 days. Relapses occurred in 20% of the vaccinated cases and 11.5% of the unvaccinated cases, and hemorrhage, perforation, and pneumonia occurred in 7.5%, 2.5%, and 10.25% respectively of the vaccinated cases as compared to 2.15%, 1.05%, and 4.15% of the unvaccinated cases. The results, therefore, in the vaccinated cases as compared to the unvaccinated cases are entirely negative as regards any favorable influence over the disease, but these results may be partially due to the failure to use larger doses, as little is known of the effect of small doses even though frequently repeated.

Watters[11] has reported upon the treatment with typhoid vaccine of 158 cases of typhoid fever; eight of these were "in extremis," and discarding these deaths the mortality was only 4.7% as compared to 13% in a parallel series of 100 cases not receiving vaccine. This author used 25,000,000 bacteria as a subcutaneous injection and repeated it every two or four days. He states, however, that much smaller doses such as from 1,000,000 to 2,000,000 bacteria at times transferred critical cases into convalescents. He has also collected the results from 1120 cases of typhoid fever treated by 104 different men. In these cases there were 67 deaths but he believes that ten of these deaths should be excluded from consideration as they were "in extremis" when treated. This leaves a total mortality of 57 or a percentage of five. The general consensus of opinion amongst these authors seems to be that the percentage of relapses was decreased, there was a more rapid defervescence of fever, the attack was of shorter duration as compared to unvaccinated cases, the general condition of the patient was improved, and the mortality was reduced. The usual doses given by these authors seemed to begin with either 250,000,000 or 500,000,000, and to be gradually increased to 1,000,000,000. A small number of the authors, however, gave much smaller doses, ranging anywhere from 10,000,000 to 100,000,000 bacteria per dose. This author emphasizes the point that an early diagnosis is most important and should be made by blood cultures, as the earlier the treatment the more favorable the results of treatment.

Garbat[12] treated 17 cases of typhoid fever with a sensitized vaccine by subcutaneous inoculations and found that the temperature subsided acutely in two cases and that the other patients ran a milder course than might be expected, the duration of the disease being shortened.

Beginning with the year 1913 the treatment of typhoid fever by vaccine has been modified in three distinct ways. A number of observers have given living sensitized typhoid cultures subcutaneously according to the method originally suggested by Besredka[13] in 1892. Others have given unsensitized killed typhoid cultures intravenously, generally using Vincent's polyvalent, ether-killed autolysate, and a third set have administered sensitized living or killed cultures intravenously. The results of these various kinds of treatment have been summarized by Gay and Chickering[14] in the following table:

TABLE 1.

SUMMARY OF RECENT CASES OF TYPHOID FEVER REPORTED AS TREATED BY NEWER METHODS OF VACCINE TREATMENT.

	Authors	No. Cases	Benefited Per Cent.	Mortality Per Cent.
1 Cases treated by subcutaneous injection of sensitized vaccine	11	253	57.0†	7.1
2 Cases treated by intravenous injection of untreated vaccine	14	259	63.0	19.0*
3 Cases treated by intravenous injection of sensitized vaccine	8	207	81.8	9.6

* Due in part to inclusion of a large number of war cases of Paulicek, where delayed transportation from the front increased mortality.

† Of 201 cases.

The results as expressed in the above table show a perceptible benefit in all of the methods used but with little influence on the fatality, but the best results were obtained by the intravenous injection of the sensitized living or killed cultures of the typhoid bacillus.

Ichikawa[15] has reported the treatment of 87 cases of typhoid fever by intravenous injection of a sensitized vaccine. This treatment resulted in an immediate and permanent recovery in about half of the cases and considerable improvement in others. The mortality was reduced to about one-half.

Gay and Chickering have also treated a number of typhoid cases themselves by means of the sensitized killed cultures, and their vaccine is made by obtaining a ground sediment of a polyvalent culture of typhoid bacilli which has been sensitized by an antityphoid serum. The cultures are then killed and precipitated by alcohol. These authors claim that the endotoxins are abstracted by using a carbolated saline solution and the remaining sediment of the bodies of the typhoid bacilli are alone used. They claim that such a vaccine gives better results in protecting rabbits against injection with the typhoid bacillus than other types of vaccine employed, and in its prophylactic use in man it produces less symptomatic disturbance and is more protective against typhoid fever than other types of commercial vaccine.

This sensitized typhoid vaccine is given intravenously for therapeutic purposes in doses ranging from 1/100 to 1/10 of a milligram. Most of the doses which were given ranged between 1/50 and 1/25 of a milligram, which would represent respectively 150,000,000 and 300,000,000 bacteria. Such doses when given intravenously produce a reaction which differs in intensity in different individuals, and when the upper range of doses is given they speak of their provoking alarming symptoms in the more susceptible individuals, although no eventual or temporary harm seems to have been done to the patient. They think it better to produce a moderate reaction to bring about the desired results. The average reaction consisted in a chill beginning an hour after the injection, lasting 15 minutes; the temperature rises 1° to 3° within three hours and then falls, and there is a leukopenia as low as 2000 to 3000 per cubic millimeter. The pulse rate is increased to about 120 and slight cyanosis and respiratory distress and discomfort may occur. The fall in temperature after three hours is accompanied by profuse sweating, relaxation and usually general amelioration of the typhoid symptoms such as headache and delirium. The patient often feels quite well and demands food, and at this time there is a rise in leucocytes of from 15,000 to 40,000 per cubic millimeter and a relative increase of the polymorphonuclear leucocytes to from 80 to 90%. The hyperleucocytosis is a characteristic reaction.

The unfavorable results with this method which have been reported have been based on the use of a vaccine more toxic than the authors' and those who have reported such results do not mention any direct action of the vaccine in producing the ultimate fatal result. The danger of intravenous injection seems to lie in the use of large doses, and Gay and Chickering do not consider that their doses have produced any untoward results. The contraindications, according to the various authors who have used the intravenous method, are hemorrhage, perforation, cholecystitis, pregnancy, and irregular heart action. The best results seem to be obtained by provoking a distinct, but not too severe reaction, characterized particularly by an excursion of the temperature and a hyperleucocytosis. A single injection may be all that is necessary, but as a rule a second injection may be necessary two or three days later before the temperature returns permanently to normal.

These authors treated 53 cases of typhoid fever and in all of these cases a diagnosis was made either by a Widal reaction, blood cultures or cultures from the feces. They divide their results into three groups, and the first group was relatively unaffected by the treatment. This consisted in 18 or 34% of the cases. The 13 cases of group 2, or 24% of the series, showed more or less benefit, a defervescence occurring by lysis following the various injections of vaccine. The duration of the disease was shortened and the course markedly ameliorated. In group 3 there were 22 cases, or 41% of the series, and in these cases an injection of the vaccine resulted in a more or less critical fall of temperature which followed the injection with the vaccine. Although the result of the treatment was favorable in many of the cases, the mortality was not markedly affected, since there were five fatal cases, giving a mortality of a little over 9%. In three of the fatal cases there was hemorrhage, two of which also were

followed by perforation. One of the other fatal cases was not treated until the twenty-first day and typhoid toxemia caused the death of the remaining case. There was no marked change in the number of relapses, since they also had five relapses, or about 5%.

SPECIFICITY OF THE TREATMENT.

These authors attribute the results to the hyperleucocytosis which is produced by the injection, and they also make mention of the increase of the antibodies, but do not venture a suggestion as to which of these antibodies is increased. It is impossible at this time to draw any final conclusions as to how the vaccine treatment of typhoid fever produces its beneficial results, as practically no work has been done in analyzing the time of appearance and the marked increase of the antibodies after these vaccine injections of typhoid fever. Stoner[16] has shown that the subcutaneous injection of sensitized typhoid vaccine will produce an increase in the opsonins, the bacteriolysins, and the agglutinins in normal persons, and Hachtel and Stoner[17] have shown in rabbits that inoculations of vaccine will produce a fair increase of antibodies two or three days after the first injection. Shoemaker[18] and Russell[19] found that the injection of typhoid vaccine caused an increase in the agglutinative titer to a dilution of from 1-10,000 to 1-20,000 as compared to about 1-10 before the injection of the vaccine. Russell[20] also found an increase in the opsonic power of the blood serum after typhoid inoculation. Wollstein[21] in studying the results of typhoid vaccine in 24 persons found that the titer of the bacteriolysins usually rose from 1-2500 to 1-10,000 after the first dose, from 1-5,000 to 1-20,000 after the second dose, and remained there or even reached 1-40,000, exceptionally 1-80,000, after the third inoculation. It may be that the vaccine stimulates all of the antibodies so that they are formed in cases quickly enough to shorten the disease by quickly destroying large numbers of the typhoid bacilli in the blood and tissues.

The work of Buxton,[22] however, casts some doubt upon the increase of bacteriolysins and opsonins having any direct effect in the destruction of the typhoid bacillus in the undiluted blood. This investigator has shown that the undiluted serum of normal rabbits will often destroy large numbers of typhoid bacilli, while the undiluted serum of rabbits immunized against the typhoid bacillus will not destroy this organism. One cubic centimeter of the undiluted normal serum usually killed about 10,000,000 typhoid bacilli. The immune serum was obtained by injecting rabbits with typhoid bacilli every ninth day and testing the bacteriolytic power on the seventh day after each inoculation. Such serum failed to kill typhoid bacilli after the rabbits had received two or more injections. These experiments show, therefore, that the undiluted serum of slightly immunized rabbits will kill the typhoid bacillus but if the rabbits are more highly immunized this effect is not produced.

Teague and McWilliams[23] have continued this work in order to study the influence of the intravenous injections of killed typhoid bacilli upon the bactericidal power of the serum of both slightly and highly immunized rabbits. They have also studied the bactericidal power of normal rabbit serum and of normal rabbits who had received one intravenous injection of typhoid bacilli. When normal rabbit serum was used 16, or nearly half of these sera, killed a million or more typhoid bacilli per cubic centimeter; six killed between 100,000 and 1,000,000 per c.c. and three specimens killed less than 10,000 per c.c., two yielding doubtful results.

In a second series of experiments the bacteriolytic effect of the serum upon normal rabbits that had received an intravenous injection of typhoid bacilli they studied this effect both before and after the injection of live or dead bacilli. The doses of typhoid bacilli varied between 15,000,000 and 1,000,000,000, but approximately the same number of typhoid bacilli were killed by the serum withdrawn after the injection of the organisms as by the serum before the animal was injected. The number of bacilli killed varied from 40,000,000 to 5,500 bacteria per cubic centimeter.

The third set of experiments was made to study the influence of the intravenous injection of typhoid bacilli upon the bactericidal property of typhoid immune rabbit serum, the animals having previously received from one to seven injections of dead typhoid bacilli. This injection slightly increased the bacteriolytic power of the immune rabbit serum if from one to two previous injections of typhoid bacilli had been given, but the inhibitory power re-

mained the same both before and after injection. After the rabbits had received three or more injections their serum destroyed about the same number of bacilli both before and after the injections but did not later inhibit even the smallest dose of typhoid bacilli.

These authors conclude that "the titer of an immune serum as determined by the usual dilution method with the addition of complement is not an indication of the bactericidal power of the blood plasma *in vivo*" and that "the bacteriolytic power of normal and highly immune antityphoid rabbit serum is neither increased nor decreased by the intravenous injection of a large dose of typhoid bacilli; the serum of a rabbit that has received only one or two immunizing injections shows a distinct but not a great increase in its bactericidal power at 5- and 24-hour intervals after such an injection."

In a further investigation[24] these same authors undertook a series of experiments in order to explain the reason for the rapid drop in temperature and the cessation in the typhoid toxemia within 24 hours after the patients had received a large intravenous injection of typhoid vaccine. Rabbits were used and large doses of typhoid vaccine were injected intravenously in one set of animals and a second set of equal number were used as a control. Twenty-four hours later the vaccinated rabbits and the control rabbits were each injected with 1 c.c. of the same suspension of living typhoid bacilli. The intravenous injection of suitable doses of this vaccine enabled these rabbits to withstand a dose of living typhoid bacilli that proved fatal to the normal rabbits. This could not be explained by a greater increase in the antibodies, since these do not appear until four or five days after the injection of vaccine. The authors thought that the results resembled those which occur in many typhoid fever patients after an intravenous injection of typhoid vaccine, the reaction by crisis in both cases occurring usually about twenty-four hours after the injection of the vaccine, this result following an earlier rapid and often extremely high rise in temperature. The result is also not due to any increase in the bacteriolytic power of the normal rabbit serum, since their previous experiments show that such injections do not produce this effect. It is also not due to the increase in the leucocytes in the peripheral blood.

In order to investigate this subject further they obtained a number of sera from normal individuals and also from typhoid patients and endeavored to find out whether the serum of typhoid patients would kill more typhoid bacilli than that of healthy persons. They thought that both kinds of serum destroyed about the same number of organisms, this number varying between 1,000,000 per c.c. and 100,000,000.

In a final résumé of this subject the authors have reviewed the various theories as to the character of typhoid fever and also have endeavored to explain the mechanism of the immunity caused by this disease. The first theory that typhoid fever is a primary septicemia and that the bacteria pass from some point in the intestinal tract directly into the blood and from thence into the lymph glands and lymphatic apparatus of the intestines is denied by these authors. They and other experimenters have shown that the typhoid bacillus cannot multiply in the blood serum of normal persons. The second theory is that typhoid fever is a primary infection of the intestinal follicles. The lymph glands are next invaded and typhoid bacilli finally enter the blood stream, where they multiply, causing a secondary septicemia. This is also denied, since the blood serum of typhoid fever patients has usually a very high bactericidal power. The third theory is that in typhoid fever the bacillus finds its way from the alimentary tract to the lymphatic system including the spleen. It develops in this system and occasionally the bacilli overflow into the blood from the lymph organs but do not multiply in the blood. The presence of a small number of typhoid bacilli in the blood during typhoid fever is suggested by the large amounts of blood (10 to 20 c.c.) needed in order to cultivate the organism in fluid media. Typhoid bacilli in the circulation of guinea pigs are also protected against the bacteriolytic serum by their ingestion into leucocytes and a few typhoid bacilli might also remain alive for a short time in the bacteriolytic serum, since it usually requires half an hour or more to completely destroy these bacilli. The real symptoms of typhoid fever may not be caused by the presence of a few bacteria in the circulation or by the extent of the local inflammatory disturbance in the intestine, but it is suggested by Adami that they may be derived from the toxic products of the typhoid bacillus either free in the blood stream or discharged from

the spleen, mesenteric glands and other local lesions.

Teague and McWilliams believe that typhoid fever is such a local infection of the lymphatic system and having accepted this idea of the disease they then review the points of other workers concerning the mechanism of typhoid immunity and end with their own explanation of this phenomenon. They do not believe that the hyperleucocytosis produced by the intravenous injection of typhoid vaccine is the explanation of the artificial immunity because the blood serum itself even without the assistance of the leucocytes is able to destroy most of the bacilli that may enter the blood. It is not due to paralysis of the heat center nor to a rapid mobilization of antibodies. The serum of typhoid patients is always strongly bacteriolytic, and the slight increase in the bacteriolytic antibodies induced by large doses of typhoid vaccine would not cause a very great change for the better in the condition of the patient. The stimulation of the non-specific ferments producing an increase in the protease and lipase of the serum has been offered as an explanation for the cure of typhoid fever patients, since the protease might produce a more rapid splitting of the toxin protein fragments of the typhoid bacillus to the lower non-toxic forms, while an increase in the lipolytic ferments might destroy the typhoid bacillus. This theory will need more experimental work before its acceptance.

It has also been thought that the violent reaction following the intravenous injection of typhoid vaccine may produce a condition of antianaphylaxis with regard to the typhoid proteins. Since the use of colon vaccine seems to cure typhoid patients in the same way as typhoid vaccine the reaction would not seem to be an anaphylactic one since it is not specific. The bacilli might continue to multiply in the local lesions and finally resensitize the patient so that the theory of antianaphylaxis is not accepted by these authors. Their own explanation of the immunity in typhoid fever produced by the intravenous injection of large doses of typhoid fever is as follows:

"We believe that typhoid fever is a local disease and not a septicemia: therefore the curative process must take place at the site of the local lesions. Hughes and Carlson[25] and Becht and Greer[26] showed that in both normal and immune animals the antibody concentration is greater in the blood serum than in the thoracic lymph. We have seen that in almost all cases of typhoid fever the serum is strongly bacteriolytic for typhoid bacilli throughout the disease; it would seem that the bacteria multiply in certain tissues because the tissue fluid or lymph does not possess this property. If the intravenous injection of vaccine should cause a more active passage of bacteriolytic substances from the blood capillaries into the lymph the destruction of the typhoid bacilli and healing of the local lesions should be effected. This is the hypothesis we wish to suggest.

This explanation might also explain the survival of the treated rabbits in the preceding article.[27] The serum of normal rabbits is usually strongly bacteriolytic for typhoid bacilli; the intravenous injection of the large dose of vaccine probably causes more of the bacteriolytic substances to pass from the blood capillaries into the lymph, so that on the following day the bacteria lodging in the spleen and liver find conditions unfavorable for growth."

NON-SPECIFIC TREATMENT.

It has been suggested that other factors may be concerned in the immunity against the typhoid bacillus, and this theory of immunity has been the outcome of the treatment of typhoid fever by certain non-specific substances.

This non-specific vaccine treatment of typhoid fever was first extensively carried out by Rumpf[28] at about the same time that Fraenkel started his specific treatment. He used thymus bouillon cultures of the Bacillus pyocyaneus beginning with a dose of 0.5 c.c. every other day for two doses, and then a dose of 1 c.c. was given after 48 hours. These injections often were sufficient to produce a permanent remission and apyrexia but occasionally 2, 4, and 6 c.c. were given at 48 hour intervals before a satisfactory result was obtained.

This non-specific immunity has been recently studied by Jobling and Peterson[29] who first point out that the bacteriolytic and agglutinin titer may not be the all important factors in the recovery from typhoid fever. These authors in trying to explain the practical abortion of the disease claim that this is non-specific, as no immediate changes in the antibody concentration in the patient takes place.

They suggest that the non-specific ferments of the body are stimulated and cause the destruc-

tion of the toxins and invading organisms. An increase in the protease might split up the toxic protein fragments and leave lower non-toxic forms. In addition an increase in the lipolytic ferments might destroy the organisms themselves by dissolving their lipoprotein surface.

Jobling and Peterson[30] in experimenting on a dog gave an intravenous injection of 10 milligrams of dried typhoid bacilli and noted that the serum protease increased from 0.11 to 0.6 milligrams per cubic centimeter. The lipase titer also increased from 1 c.c. hundredth normal sodium hydroxide to 7 c.c. per cubic centimeter of serum. This result seemed to indicate that these substances may play a part in the destruction of the organism in the blood.

These observers also suggest that as the crude typhoid vaccine may do harm by acting on a weak heart or increasing peristalsis, that some split product of the bacterial protein which is non-toxic should be used. The protoalbumose fraction is very toxic, but the secondary protecses are not toxic. Ludke[31] and the authors have already obtained favorable results by the use of this non-toxic proteose, and the outcome seems favorable.

The former author obtained favorable results in typhoid fever by the intravenous injection of .001 c.c. of killed cultures of the Bacillus coli and artificially obtained deutero-albumose. The dose of the Merck's deutero-albumose was 1 c.c. of either a 2% or 4% solution. Twenty-two cases were treated and seven of these showed a critical fall of temperature soon after the injections. Three cases showed a gradual reduction of temperature that fell to normal in from 5 to 11 days; 3 cases showed no effect. A favorable influence upon the typhoid process, therefore, was obtained in 19 out of 22 cases. The titer of the agglutination curve was not affected by the treatment.

Jobling and Peterson[32] injected a patient on the seventh day with 2 c.c. of a 2% solution of a secondary proteose and on the ninth day with a 4% solution. There was a drop of temperature after the first injection and a permanent remission to normal after the second injection. The lipase titer of the serum increased from 0.6 of a c.c. hundredth normal sodium hydroxide to 1.9 c.c. and the protease became positive after the first injection. The proteoses in the serum increased from 0.1 mg. (nitrogen) per 5 c.c. of serum to 0.24 mg. in 3 days.

RECENT WORK.

The various army surgeons of the Eastern front during the world's war have used typhoid vaccine with favorable results. Biedl, Eggerth and Paltauf[33] treated 43 cases of typhoid fever by intravenous injection of from 0.5 to 1 cubic centimeter of Besredka's sensitized living typhoid bacillus. In all of these cases after a preliminary rise of temperature the temperature reached normal in from 12 to 24 hours. This condition was lasting in all but three cases which later showed rises of temperature due to such complications as endocarditis, purulent parotitis, and suppurative periostitis. In these cases the injections were made from the seventh to the sixteenth day of the disease.

V. Korányi[34] used the Ichikawa vaccine upon 29 cases of typhoid fever. Five of his cases received doses ranging from 0.3 to 0.7 or 0.8 of a cubic centimeter, and as the former dose was considered too small and the latter two doses too large he excluded these cases from his study. The other 24 received from 0.4 to 0.5 of a cubic centimeter of the vaccine. The method of administration is not mentioned but it is presumed that the vaccine was given by intravenous injection, as this was the method recommended by Ichikawa. None of these 24 cases died, and the reaction following the vaccine followed four distinct courses. Soon after the injection the usual chill and rise of temperature took place and no symptoms of collapse were noted. Seven of these cases exhibited a fall of temperature to normal by a crisis; three showed a fall of temperature to normal by lysis within a few days; seven showed distinct betterment after treatment but no distinct change in the duration of the disease, and seven cases were not influenced by the treatment.

Goldscheider and Aust[35] made quite an extensive study of the results following the injection of 57 cases of typhoid. They began with doses of 250,000,000 typhoid bacilli but later used doses of 500,000,000 and 750,000,000 organisms. In 52 cases which were treated with 250,000,000 bacilli or by 500,000,000 bacilli the results were as follows: The cases treated by the former method showed a rapid fall of the temperature to normal or a more gradual remission of the fever in 72.9% of cases, while when the latter dose was used these effects were noted in 62.9% of cases. With the former method of dosage 27% of cases showed no results, while

with the latter dosage 37% of cases were without beneficial results. Five cases were treated with 750,000,000 typhoid bacilli and four showed rapid decline of temperature to normal, while one showed a lower remission with an evident shortening of the disease. Subcutaneous injections were given, and in a few cases second doses at the end of a week were administered, and these seemed at times to increase the favorable effect of the first dose. This article contains a very complete analysis of the results of this subject.

Csernel and Márton[36] regard the sensitized vaccine of Besredka as dangerous and have produced a vaccine by washing ten or fifteen agar plates of the typhoid bacillus and incubating for 24 hours. They then wash off the growth in 0.9% salt solution, count the number of bacteria with the blood counter and preserve with ½% carbolic acid. They dilute the suspension so that one cubic centimeter contains 15,000,000 bacteria, and they injected this polyvalent vaccine intravenously in doses of ¼, ½ and 1 cubic centimeter. These injections were followed by the usual chill and rise of temperature, followed by a fall of temperature by crisis in three cases. In five cases after the fall of temperature the fever rose for a few days but then fell again to normal. In one severe case the temperature fell gradually by lysis. In one case the first vaccination showed no effect but a second dose four days later produced a gradual decline of fever. In five cases there was a shortening of the period of fever. In three cases the patients were free from fever for three days but the temperature then rose and then gradually fell to normal, showing a shortening of the period of fever. One case developed pneumonia and one died from intestinal perforation. These authors conclude that the intravenous injection of this vaccine at times produces a critical fall of temperature and at other times produces a strong oscillation of the continued fever and modifies the intensity of the disease.

Mazza[37] reports the results of several other observers in the use of typhoid vaccine in the treatment of typhoid fever and mentions the work of Arden-Delteil, Négri, and Reynaud,[38] who used the sensitized Besredka vaccine in 37 cases, with a mortality of 8.3%. Netter using the same vaccine had a mortality of 7.1% in 18 cases and reduced the average duration of the disease from 21 in untreated cases to 14 in treated cases. Von Petrovich[40] used the Wright vaccine in 220 cases in Serbia during the war and had a mortality of only 2.9%, while those who were not treated showed a mortality of 12.8%. Weil[41] treated 14 children with the ether-killed Vincent vaccine with a mortality of 0.0% and Variot[42] treated 69 children with this preparation with brilliant results and demonstrated its lack of danger.

F. Torres[43] used the vaccine of Chantemesse by the intravenous method in six cases in which three died and three showed a gradual fall of temperature followed by a permanent afebrile condition. Dessy, Grappiolo and Fossati[44] used a polyvalent vaccine made according to the method of Lustig in which the protein was abstracted by alkali in which one cubic centimeter of the preparation represented 0.001 of a cubic centimeter of the fresh bacterial suspension corresponding to about 500,000,000 bacteria. They injected 1/5 of a cubic centimeter subcutaneously and after one to three days from 1 to 2 cubic centimeters intravenously. The five cases treated showed favorable results. The subcutaneous doses comprised 200,000,000 bacteria given at 12-hour intervals for three injections, 250,000,000 to 300,000,000 given in three days at 5-day intervals, and 1,000,000,000 bacteria followed in 8 days by 1,500,000,000.

PERSONAL OBSERVATIONS.

The first set of cases with which we have had experience consists in 31 cases treated at the Mercy Hospital. The dosage used was 10,000,000 bacteria usually given subcutaneously at intervals of several days. The number of doses varied between one and six. We simply mention these cases to emphasize the opinion that no practical results were obtained by this small dosage since the average duration of the disease was 30 days, and cases which even received the first dose on the second, third, and fourth days showed no tendency towards a decrease in the duration of the disease. The mortality in these cases was 5, or 16.1%, but of course a percentage based upon such a small number of cases is not reliable.

The next set of cases was treated during 1913 and consisted of about 60 cases. Doses beginning with 50,000,000 with an increase to 100,000,000 and 250,000,000 at intervals of several days were used. We regret that the record cards relating to these cases have been lost but the general impression of the physicians who

examined these cases, however, was that the duration of the disease was shortened in a fair number of cases and that not a few showed actual rapid decline of the temperature to normal after several of the doses had been given.

Our third series of 10 cases were treated in 1916 at the University Hospital by intravenous injections of a sensitized typhoid vaccine made from the Rawling's strain. Immune serum was added to the vaccine until the agglutinins had all been saturated by the immune serum. Of these 10 cases six were treated before the tenth day and were verified by blood cultures and the Widal reaction. Four cases were treated after the tenth day and showed only a positive Widal test, the blood cultures being negative. In five of the six early cases treated two injections were given at intervals of about four days and in three of these cases the disease seemed to be aborted. In two other cases the temperature gradually dropped to normal in about 18 days and remained so. In the other early case only one injection was given and the case followed the regular typhoid course. Doses of 300,000,000 bacteria were given and the injection was followed by a slight chill and a rise in temperature of from 1 to 1½°, and no dangerous symptoms were noted. In the four late cases the Widal was positive but the blood culture was negative and the vaccine did no harm but no apparent benefit was derived from the treatment.

A CURATIVE SERUM FOR TYPHOID FEVER.

Very little work has been done in attempting to produce a curative serum for typhoid fever. This method of treatment would be brought about only by the production of a passive immunity and not by any physiological action produced by the injection of the live or dead typhoid bacilli contained in the vaccines. The immune bodies such as the agglutinins, the bacteriolysins and the opsonins are simply introduced into the body by the injection of the serum containing these substances. Chantemesse[45] produced a curative serum by injecting horses with the endotoxin of the typhoid bacillus, and he obtained a fatality of 3% in 168 cases as compared to that of 19% in the hospitals of Paris. One of us (Stokes) and Fulton[46] prepared a curative serum by injecting hogs with increasing doses of bouillon cultures of the typhoid bacillus and produced a serum with an agglutinative titer of 1-45,000. This serum also protected guinea pigs against from four to five times the minimum fatal dose of the typhoid bacillus. Twenty-three cases were treated in all stages of the disease with two deaths, one resulting from otitis media and the other from intestinal hemorrhage; 15 of the other 21 cases seemed to show favorable results from the use of the serum.

CONCLUSIONS.

The disease known as typhoid fever was described by Hippocrates about 400 years B.C. as a continued fever with diarrhea; offensive, watery stools; bilious vomiting, tympanitis, abdominal pain; red rashes; epistaxis; sleeplessness; coma; delirium; subsultus; irregular remissions; a lengthened duration; and emaciation. The disease has been known to medical observers for about 2300 years, although during the latter centuries it was confused with typhus fever.

During all of this time the disease has been accompanied by the inevitable, unavoidable, preordained fatality of about 10%*, and not one of the hundreds of remedies and treatments proposed, used, forsaken, and forgotten has changed this immutable figure.

It would appear from recent developments that this fatal figure can be reduced by a specific and even, perhaps, by a non-specific treatment.

This treatment should be studied in all of its aspects and, if the risks can be reduced to a minimum by the use of non-toxic substances which are as efficacious as the cruder materials, such materials should be used. The treatment by a curative serum, both alone and in combination with the vaccine treatment, should also be tried out.

Large numbers of cases should be treated by the various methods, and each group should be compared with the other groups and with a group of untreated ones. These observations

* The fatality in typhoid fever of course varies according to the age, season, station in life, and place of treatment, but Murchison, in the "Continued Fevers of Great Britain," 1884, shows that the fatality in the London and French hospitals was respectively 17.26% and 17.45%. Osler, in his "Principles and Practices of Medicine," 1916, states that the fatality in 1500 cases in Johns Hopkins Hospital was 9.1%, but that it may vary in private practice from 5% to 12%, and in hospital practice from 7% to 20%, the hospitals probably receiving a larger percentage of the more serious cases. Whipple, in "Typhoid Fever," 1908, states than "when complete statistics are obtained the percentage fatality in typhoid fever almost never exceeds 10%." From 1914 to 1918 inclusive, there were 9,119 cases of typhoid fever reported in the State Department of Health from Maryland, exclusive of Baltimore, and 879 deaths, and Dr. F. V. Beitler, Chief of the Bureau of Vital Statistics, believes that the registration of cases is practically complete. The fatality varied between a maximum of 11.9 and a minimum of 8.7, and the average fatality for the period of 5 years was 9.6%. This figure might be considered as fairly accurate, since it represents all varieties of cases.

should include the statistical study of the fatality, percentage of complications, relapses, and unfavorable symptoms in the various groups, and the height of fever and duration of fever.

Numerous observations should be made of the appearance and concentration of the various antibodies and ferments in the blood and lympn, if possible, of the various groups in order to understand the mechanism of the immunity produced and to ascertain the best mode of treatment.

REFERENCES.

[1] Deutsch. med. Woch., Vol. xix, 1893, p. 985.
[2] Deutsch. med. Woch., Vol. xxviii, 1894, p. 212.
[3] Centralb. f. inn. Med., Vol. xxix, 1908, p. 989.
[4] Med. Rec., Vol. lxxv, 1909, p. 93.
[5] Jour. Roy. Army Med. Corps, Vol. xiii, 1909, p. 136.
[6] Amer. Jour. Med. Sci., Vol. clxiv, 1912, p. 350.
[7] Amer. Jour. Med. Sci., Vol. cxlix, 1915, p. 406.
[8] Brit. Med. Jour., 1914, Vol. ii, pp. 175, 2795.
[9] Bul. et Mem. Soc. Méd. des Hôp. de Paris, 1913, xxxvi, 126.
[10] Boston Medical and Surgical Journal, Vol. clxx, No. 26, 1914, p. 986.
[11] Med. Rec., N. Y., Vol. lxxxiv, 1913, p. 518.
[12] Jour. A. M. A., Vol. lxiv, 1915, p. 489.
[14] Archiv. of Int. Med., 1916, Vol. xvii, p. 303.
[15] Annales de l'Institute Pasteur, Vol. xvi, 1902, p. 918.
[15] Ztschr. f. Immunitatsforsch, Vol. xxiii, 1914, p. 82.
[16] Jour. Immunology, Vol. i, October, 1919, No. 5.
[17] Jour. Infec. Diseases, Vol. xix, September, 1916, No. 3, p. 332.
[18] New York Med. Jour., Vol. i, 1909, p. 265.
[19] Bull. Johns Hopkins Hosp., Vol. xxi, 1910, p. 83.
[20] Bull. Johns Hopkins Hosp., Vol. xxi, 1910, p. 83.
[21] Jour. Exp. Med., Vol. xvi, 1912, p. 315.
[22] Jour. Med. Research, Vol. xiii, No. 3, February, 1905, p. 305; No. 5, p. 431.
[23] Jour. of Immunol., Vol. ii, No. 2, February, 1917, p. 167.
[24] Jour. of Immunol., Vol. ii, No. 2, February, 1917. pp. 185 and 193.
[25] Jour. of Infect. Dis., 1910, 7, p. 127.
[26] Amer. Jour. Physiol., 1908, 21, 236.
[27] Article No. 2, Jour. of Immunol., Vol. ii, No. 2, February, 1917, Teague and McWilliams.
[28] Deutsch. med. Woch., Vol. xix, 1893, p. 987.
[29] Jour. A. M. A., Vol. lxv, 6, 1916, p. 515.
[30] *Ibid.*, Vol. lxv, Aug. 7, 1915, p. 515.
[31] Münch. med. Woch., Vol. lxii, 1915, p. 321.
[32] Jour. A. M. A., Vol. lxvi, 1916, p. 1753.
[33] Wien. Klin Woch., No. 28, 1915, p. 125.
[34] Wien. klin. Woch., No. 28, 1915, p. 85.
[35] Deutsch. med. Woch., Vol. xli, 1915, p. 361.
[36] Wien. klin. Woch., Vol. xxviii, 1915, pp. 229 and 733.
[37] Wien. klin. Woch., Vol. xxviii, 1915, p. 64.
[38] Compt. Rend. Acad. des Sc., Vol. clx, 1912, p. 1174.
[39] Soc. méd. des Hôp., Vol. x, July, 1913.
[40] Bull. de l'Académie de Médecine, Vol. lxxv, 1916, p. 725.
[41] Cited by Mazza, No. 1.
[42] Cited by Mazza.
[43] Sem. med. Buenos Aires, Vol. xx, pt. 2, 1913, pp. 1557-1562.
[44] Sem. med. Buenos Aires, Vol. xxi, 1914, pp. 357-370.
[45] La presse méd., No. 103, Dec. 21, 1962.
[46] Jour. A. M. A., Vol. xliv, 1905, p. 1504.

WHAT IS INFLUENZA?

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The pandemic has shown how little is known of the cause and nature of influenza. If the disease had appeared for the first time in human history it could scarcely have produced greater confusion. If, instead of striking, as it did, like an old enemy, and after flying its warning signals for months before the attack, it had come unheralded and for the first time, it could scarcely have found the world less prepared for it. Nobody seemed to recognize the disease or to know what to do—or what it was useless to do—in order to stop it.

Now that the blow had been delivered it is desirable to see what lessons can be learned from it. It is necessary to be prepared for what may still be in store for us. It is by no means possible that we are done with the disease. It seems to have disappeared for the present, but it may return.

And there is still another and an equally good reason for studying this pandemic. Information gained in connection with the influenza may be valuable in dealing with other respiratory infections. It is unnecessary to say how useful such facts promise to be when it is remembered that respiratory diseases as a class constitute the leading cause of death in most civilized communities under normal conditions.

THE EPIDEMIC ASPECTS.

It is curious to observe how little that is strictly accurate is known about the epidemiological aspects of the disease which has just been prevalent. There is even disagreement as to the identity of what we call influenza. Where it came from, why it struck when it did, as it did, and even the force of the blow, are largely matters of conjecture.

The records now available of many of the city and camp epidemics included in the great outburst are so inaccurate as hardly to warrant a scientific statistical discussion of them. The records of the cases are inaccurate because of uncertain diagnoses and lack of reliable reporting.

The cases which were complicated with pneumonia were reported more correctly than the cases of influenza alone because the diagnosis was more certain, the number smaller and the disease more grave.

The records of death more nearly approach to accuracy than do the records of cases either of influenza or pneumonia. But even here the data are not wholly reliable. During the period of the pandemic, deaths were ascribed to influenza or pneumonia which, under ordinary circumstances, would have been attributed to other causes. And unless the consequences of this pandemic differ from those of its predecessors, many deaths largely attributable to influenza will, for a long time, be reported by physicians as due to other causes. This is likely to be the

case particularly in respect to the less commonly recognized sequelae.

The question of what should be set down as the cause of death where influenza was but one of two or more diseases from which the patient suffered should have received careful consideration in each instance. Attempts have been made to regulate all such questions by rule. The Manual of the International List of the Causes of Death suggests that (1) if one of two diseases is an immediate and frequent complication of another it is the other which should be set down as the primary cause of death. If this rule cannot be followed, the manual proposes that others be applied in the following order, it being understood that as soon as a rule is found which is capable of deciding the matter no subsequently mentioned rule is to be considered; (2) if one disease is surely fatal and the other of less gravity, the former should be stated as the cause; (3) if one is epidemic and the other not so, the death should be ascribed to the epidemic disease; (4) if one is more frequently fatal than the other, the more fatal disease should be given; (5) if none of these rules applies, that diagnosis should be selected which best characterizes the case. In the pandemic only cases which in all probability would have proved fatal without the influenza should not be charged to it.

Had these rules been followed the deaths ascribed to influenza would have been far more numerous than they were. We should not be talking about influenza and pneumonia as though they had been separately epidemic. We should look upon influenza as the essential thing and regard the pneumonia as having been precipitated by the influenza. This seems to be the proper way to look at it and it is so regarded in this paper.

THE THREE WAYS OF IDENTIFYING THE DISEASE.

There are three ways of recognizing the identity of an infectious disease: (1) By the clinical evidence, (2) by the bacteriological evidence, (3) by the epidemiological evidence. Each may be useful; each may be conclusive. In case of doubt, none should be overlooked. Let us consider briefly the light which each one of these three kinds of evidence can throw upon the identity of the disease which has been pandemic.

First, as to the clinical aspects. At the outbreak of the pandemic in September, 1918, a memorandum was issued by the Acting Surgeon General of the Army to all camp and division surgeons, surgeons of recruit depots and independent stations, department surgeons and the air service division, in which the characteristic symptoms of the disease, the probable means of transmission and the steps which should be taken against it were stated. It was believed that the conception of influenza which was inherited from another generation still held good. On this point the memorandum said:

"It is important that influenza be kept out of the camps as far as practicable. To this end it must be recognized as a disease which is distinct and separate from the so-called 'cold,' bronchitis, laryngitis, coryza, rhinitis and from 'fever, type undetermined,' which are continually with us and from time to time become prevalent. The influenza which is now epidemic is not a part of, or a cause of, or the consequence of any of these diseases. It is a specific infection with a characteristic symptom complex.

"The leading symptoms are: Severe headache; chills and chilliness; pain in the back and legs; temperature sometimes as high as 104; great prostration: drowsiness. Occasionally there are nervous symptoms; sometimes, but not always, the eyes and air passages of the nose and throat are affected; there may be gastro-intestinal disturbances. The onset is sudden. The bacteriology is not definitely established: Often the Pfeiffer bacillus can be isolated. The most fatal complication is pneumonia. In most instances the patient recovers in three or four days but is entirely incapacitated for duty while the attack is at its height."

The chief symptoms reported from the camps were substantially as thus outlined. Sudden onset, headache, prostration, fever and injected conjunctivae were reported as the most invariable symptoms. The symptoms of the common respiratory infections of ordinary times were not prominent. Coryza was by no means invariable; in some camps as Kearney, Grant, Johnston, and MacArthur it was unusual. Sneezing was not a reliable sign. Sore throat was uncommon, particularly at some camps, as Lee, Johnston, Lewis, and Beauregard. Generally there was coughing, but this may have been due to the bronchitis which was not improbably independently epidemic.

The most serious clinical feature of the disease was its liability to lead to pneumonia. Had it not been for this tendency, the pandemic might not have attracted much attention. Nearly all who died succumbed to pneumonia.

The pneumonia made its attack and proved fatal, probably because the natural protective mechanism of the respiratory tract was destroyed in some way by the influenza. How, nobody can say. But this was obvious: when a patient was attacked by influenza, his damaged respiratory mucous membrane was unequal to the task of preventing the invasion of germs which were capable of growing in the lung and so causing pneumonia. The result was that some of the pneumonia was produced by one organism, some by another; some was primary rather than secondary and was caused by the influenza virus itself.

Second, with regard to the bacteriology. Some think there was no influenza because the bacillus of Pfeiffer was not always found. Others insist that the Pfeiffer bacillus had nothing to do with the matter: that the disease was due to an organism which has not yet been discovered; perhaps to a filterable virus. From the evidence at hand one is not justified in taking either position. It is unwise in the present state of knowledge, or lack of it, to insist that we have not had influenza because the Pfeiffer bacillus has not always been recoverable.

Third, and finally, with reference to the epidemiology. The disease could be identified by its epidemiology alone. No other respiratory infection is so rapid or so universal in its spread; none, so far as known, has such a short period of incubation; none is so disabling and so quickly done with; none so completely baffles the efforts made to control it. Rapidity of action characterizes every aspect of influenza.

If influenza behaves as does other infectious diseases, we ought to regard it as possessing the three following epidemiological forms: (1) Pandemic influenza, (2) epidemic influenza, and (3) endemic influenza. The difference between these types depends both upon the activity of the virus and the susceptibility of the individual members of the population who are exposed to it. The evidence, as shown elsewhere in this paper, indicates that influenza probably possesses these three forms.

THE EVOLUTION OF THE PANDEMIC.

Probably nobody will ever be able to say how the highly virulent form of the disease originated or where or when. Inferentially it was developed from a mild infection which was endemic. If this is so, it probably grew in virulence by attacking persons who were especially susceptible to it. Presumably they were susceptible because they had not been exposed to it before. Susceptible visitors to the endemic focus, or travelers passing from such a focus to people who had not experienced influenza, might have furnished the means of its transmission and exaltation.

The exaltation of the virus was probably rapid, not gradual; it developed quickly when all the conditions necessary for it occurred. It probably increased by stages or steps, each representing a state of higher virulence than its predecessor. There may have been one place or many where these changes occurred. Place probably had little to do with the matter; season seems to have nothing to do with it. Social status played no part. The development of high virulence was simply the product of a virus acting in a favorable human environment.

Once the disease had developed into its malignant form, it is not difficult to see how it continued to spread until practically all the susceptible material everywhere was used up. It swept rapidly from place to place, its presence being recognized chiefly by its complications.

The highly virulent state of the virus probably declined as it had increased. As the infective poison met more and more resistant persons, it became more and more reduced in virulence. Finally, the pandemic, which started as a contest between a strong virus and a susceptible population, became a struggle between a weakened virus and an immune population. Then the disease disappeared, so far as its pandemic and epidemic forms are concerned. It could not continue, for it had little to feed on. In this way it returned to its endemic form.

Capacity to undergo marked and rapid changes in virulence appears to be characteristic of the influenza virus. It is perhaps in consequence of this that, under ordinary circumstances, the infective poison is not capable of producing either a great deal of sickness or very severe cases, while from time to time the reverse occurs.

A condition believed to be favorable to in-

crease the virulence is the crowding of many susceptibles together. Crowding favors exaltation by (a) providing short routes of infection, and (b) insuring the transmission of large and repeated doses to many persons. Among a great many some are likely to be particularly effective as accelerators of virulence.

It is easy to imagine how an epidemic wave may be set in motion from a place wherein a virus of uncommon virulence has been produced. It starts when enough force has been gathered by the virus to overcome the resistance of the people among whom it has spread. It is not essential that the highest possible degree of virulence shall be produced in order that a wave shall be started; it is only necessary that a sufficient degree of exaltation shall occur to overcome the immunity which the population possesses.

If this is so, a wave of mild influenza may or may not protect those who experience it from a more severe one. If the difference in virulence is not very great the protection may be sufficient and no wave starts; if it is great and the exposure either excessive or long continued, the immunity may not be enough and an epidemic is set going. It is when a virus which has been for a time restricted is spread to a small group of susceptibles, and has consequently gained a high state of virulence, is suddenly released upon a large susceptible population that the great waves of malignant influenza are produced. In this case it is as though a great deal of energy was accumulated and natural means of defense were not developed.

All this is theory. It is constructed upon biological principles and some observed facts, the whole being put together by inductive reasoning. To hold, the theory must agree with what is known of influenza and it must not contradict any genuinely established fact. It is believed by the writer to answer these requirements at the present time. It is not advanced as a demonstration but as a possible explanation. It is offered as a convenient one to use until a better one is produced.

THE DIFFERENCE IN FATALITY.

Among the most interesting features of the pandemic has been the difference which has occurred in the death rates in the different camps and cities of the United States. No useful data are available for the cities because no reliable records were made of the cases. The case mortality in the camps varied between 4.5 and 30. The lowest rates were in the southern camps and among those which were attacked last. The highest rates were generally on the seaboard and in the northern and eastern sections of the country. If the invasiveness of the infective agent varied as much as did its virulence there was a great difference in the number of people who were taken sick in proportion to the population in different parts of the world. Upon this point there is little evidence, but such as there is indicates that the disease was much less prevalent in some places than in others.

There is no tracing the disease in its progress over the world from the records of cases or of deaths. It seems not to have traveled east or west, but to have scattered in every direction: It was in Switzerland, England, India, and Brazil, in June, 1918. In July it was in China, the Netherlands, Norway, and North Africa. In August it was reported in the United States, Spain, Greece, and the West Indies. By the end of September practically every state in the Union had been visited. Earlier still, influenza was seen in epidemic form in the United States in March, 1918, and an outbreak in a group of southern army camps was reported by the present writer at that time.* It would not be surprising if many waves had preceded the great and fatal one. Certainly there was a wave of large proportions some months before the main pandemic.

THE QUESTION OF SUSCEPTIBILITY.

What of the occasional cases which followed after the main outburst and what of the secondary outbreaks which, in some places, followed the first? How shall we explain the occasional cases which even now are coming to light after nearly a year? Have all these been influenza? Yes, most of them. Some of the late cases were probably as truly influenza as were the early ones.

The late cases did not occur earlier because the victims were not reached by a sufficiently virulent strain of virus to overcome the degree of immunity which they possessed. Susceptibility played a prominent part throughout the pandemic. It was not only the spread of the virus which determined the course which the epidemic took; liability to infection had quite

* Journal of Laboratory and Clinical Medicine, June, 1918, Vol. iii, No. 9, p. 567.

as much to do with the distribution of the cases in point of time and space as did the spread of the infective poison itself. This is a general truth which applies to all outbursts of disease. The intensity and extent of an epidemic is not merely a question of how the virus becomes distributed. The distribution is always greater than the cases indicate. In the epidemic of 1918, the statistics of deaths and of cases merely records the rates at which the susceptibles were reached.

Another view which is advanced in order to account for recrudescences and delayed cases is that the infectious matter did not reach all its victims during the height of the epidemic wave, some being isolated in one way or another until the great mass of cases were over. This theory would be more tenable if it could be shown that some people could live in a thickly settled community and not be reached by a virus of such pervasiveness as that of influenza. Such proof is not to be expected. Influenza travels almost as fast as man can travel, showing that it is highly invasive. It is probable that when an epidemic visited a city everybody came in contact with the virus within a few weeks.

It is remarkable to note how the pandemic showed a preference for a certain age group. Young persons and old were relatively immune. This fact has not been satisfactorily explained. There is a possible explanation which, if correct, clears up more than one mystery connected with the pandemic.

It is possible that those who escaped had had influenza before. The old could certainly have experienced an attack during the known visitation of influenza between twenty and thirty years ago. The young may have had it much more recently; they may have had influenza a year ago, or two years ago. They certainly never experienced the severe form of the disease which swept the country in the autumn of 1918, but they may have been attacked in a mild wave, such as that which is known to have occurred in the spring of 1918. This, and apparently this only, could have rendered them immune.

It is not improbable, then, that the wave of September, 1918, was the culmination of other waves and it is within the bounds of reason to suppose that in these others the young and old, or the young alone, were the ones chiefly attacked. If this seems to argue that the influenza then showed a selective preference it can be replied that this was to be expected. All respiratory infections show a preference for the young and old.

WAS THE EPIDEMIC A MIXED INFECTION?

Some persons have been solicitous to know how to interpret the reports of influenza which were made during the course of the epidemic. Do they always refer to the same disease? Has influenza manifold aspects? How broad should the definitions of it be?

Some camps preferred not to call their epidemics influenza at all: Some reported that the type changed during the course of the epidemic. Few reported what some persons think to be the fact, namely, that influenza and other respiratory infections existed side by side.

There are two ways of looking at this subject: The first sets influenza down as a group of more or less similar infections; the other regards the whole group as manifestations of the same disease.

The principal diseases of the group whose members are often called influenza are coryza, rhinitis, pharyngitis and laryngitis. Any of these may be termed a cold, or influenza, according to the preference of the physician or the patient himself.

There is a distinct preference for the use of the term influenza. To most persons a "mere cold" is a trifling affair and they do not want to have a disease which confines them to the house called by that name. Few recognize the meaning of coryza, rhinitis, or pharyngitis. To many even laryngitis does not sound especially significant. On the other hand, influenza or grippe is a popular designation. From our experience of a generation ago, most persons know that influenza may be a serious affair, and there are obvious reasons why it is preferred by the laity and by the doctor to any of the other terms, even though it lacks definiteness. From one point of view this very lack of definiteness is an advantage.

As a means of understanding the relative prevalence of influenza, bronchitis, and pneumonia as reported in civil life, it is interesting to consider the following pre-epidemic statistics.

PRE-EPIDEMIC STATISTICS.

Ever since the pandemic of 1889-90, influenza has been supposed to be present in the United States. There have been many restricted and

some moderately pandemic waves reported. In most instances the outbreaks have been fairly local. The disease itself, whatever its identity, has generally been relatively mild. It has not been notably associated with pneumonia.

In the army, what was called influenza was prevalent in 1903, 1904, 1905, 1907, 1908, and 1909. There was remarkably little in 1902 to 1906 and between 1909 and 1914. It has been essentially a winter disease, generally starting from a slight prevalence in December (a rate of less than twenty-five cases per thousand of all troops annually), rising to a maximum in February or March (125 to 175), and falling quickly by April (25) to reach its lowest point (less than 10) in midsummer. In the last twenty years there have been no summer or autumn outbreaks and no recurrent waves such as are characteristic of pandemic influenza. The nearest approach to pandemic pneumonia occurred in 1918, when, after five years of relatively little influenza, there were two periods of prevalence, one in February and March and the other in December.

Compared with the seasonal distribution of bronchitis, influenza has been less evenly distributed through the year in the army; the periods of prevalence have been shorter and sharper and at the times of quiescence the disease has more nearly disappeared. The month of maximum prevalence has often been the same for bronchitis and influenza. In those years in which influenza has been exceptionally prevalent, bronchitis has often been unusually prevalent also. From the studies which have been made, it seems safe to infer that the word "influenza," has been used only as the name of a group of the minor respiratory infections which are prevalent everywhere in the winter months.

With reference to pneumonia, there has until recently been so little pneumonia in the army that the monthly distribution of cases does not appear to be significant. Pneumonia has been almost uniformly present throughout the year, the curve reaching its low-lying summit between January and March and its greatest depression in midsummer.

Turning now to the records of the United States Census Bureau for the forty-seven largest cities of the United States for the seven years 1910-1916, we find the same general seasonal prevalence existed in influenza, bronchitis, and pneumonia. We must here shift our attention from cases of disease to deaths, since the Census Bureau only deals with the death records. This somewhat alters the situation, inasmuch as there are relatively few deaths ascribed to influenza and bronchitis and an excessive number to pneumonia in all such statistics. Furthermore, in vital statistics collected from civil communities, the age distribution of the population from which the data are derived is different from that in the army. The death rate from bronchitis is particularly high among children and pneumonia is essentially a disease of old age. One would expect, therefore, to find a good deal more pneumonia in civil life than in the army. Fortunately, the characteristics mentioned do not effect the relative seasonal prevalence.

Influenza, bronchitis, and pneumonia have all been essentially winter diseases in the cities and they have shown a tendency to drag along into spring. January has almost invariably been the month of greatest prevalence for influenza. In more than half the cities influenza has been practically absent between May and November. A few cities have shown an extended prevalence between April and October.

Bronchitis has been so uniformly present all the year through in the cities that it is easier to state when it has been least common than to name the months of its greatest prevalence. Generally, its seasonal distribution has corresponded with that of influenza except that its occurrence has been more continued and less irregular in a few cities where there have been long and severe seasons of it.

Pneumonia has shown less monthly variation than influenza or bronchitis in the cities, but it is essentially a disease of the colder half of the year. According to the statistics available, the month of greatest prevalence has always been December and March.

How are we to interpret the death rates from influenza and bronchitis reported by the cities? Did the people really die of the disease named? Probably not. According to the International List of Causes of Death, pneumonia should have been given as the cause of death in all or nearly all instances. The differences in the death rates from influenza and bronchitis which occur in different cities are probably ascribable to differences in the local custom of naming the disease. What is called influenza in one place may be termed bronchitis in another. It is probable that the high death rate from influenza at New Orleans and the excessive rate from bronchitis at Fall River mean that those cities had a good

deal of sickness which terminated in fatal pneumonia. It is certain that in ordinary times influenza, bronchitis, and pneumonia are frequently confused both in diagnosis and in the custom of reporting.

Probably there is a difference in the leading symptoms which accounts for the preponderance of reports in favor of influenza in some places and of bronchitis in others. Thus, bronchitis may be named in cities where the bronchial and laryngeal symptoms are prominent and frequent, and influenza is given where the nasal symptoms and sinuses are particularly involved. It is reasonable to suppose that there should be a difference in the leading symptoms where the predominating occupations and races are so different as they are among the cities of the United States. Manufacturing towns seem to have an excessive amount of bronchitis, a fact which may likely be due to conditions connected with the industries. Where southern towns have high influenza and bronchitis death rates the excessive mortality is generally ascribed to a predisposition on the part of the negro race to those diseases.

The healthiest cities, so far as bronchitis, influenza, and pneumonia are concerned, are those of the West and Northwest, where neither manufactories, race, or age contribute to elevate the death rate from respiratory affections. Seattle, Spokane, Portland, Minneapolis, and Oakland have all low rates from these diseases.

Summarizing what has been said here with regard to statistics there is some chance that influenza has been occasionally or continually present in relatively mild form; that it has occasionally swept here and there in more or less broad but mild epidemics; and that it has recently increased greatly in severity.

The weight of evidence of all kinds indicates that the influenza which was pandemic is a highly virulent form of a disease which is commonly with us.

Clinical Department.

CASE REPORT: TRANSPOSITION OF VISCERA, TERTIARY SYPHILIS.

By C. Guy Lane, M.D., Boston.

C. J. M., 27 years old, white, single, cook in the U. S. Fire & Guard, was referred to the dermatological ward of the Embarkation Hospital, Newport News, Va., because of an ulcer on the outer surface of the left lower leg, and an eruption on the face and scalp. In the course of the examination it was noted that there was a visible impulse in the fifth right interspace inside the nipple line. With the stethoscope the point of maximum intensity of the heart sounds was found to be coincident with this impulse, and the heart sounds were found to be normal in rate and rhythm, regular and clear cut, without murmurs. Percussion indicated the right border of dullness to be 2 cm. inside the right nipple line at this place, the upper border at the fourth rib, and the left border at the midsternal line. On the left side of the chest in front, resonance extended to the fifth rib, and in the back both sides were resonant throughout. The lungs showed clear vesicular breathing everywhere with no râles.

Inspection of the skin demonstrated the fact that there were several different types of lesions present. On the face, neck and ears were several discrete, rather large, rounded papules, brown-red in color, some of them with gray scales adherent. Near the hair margin on the back of the scalp were three lesions, distinctly annular in arrangement, and made up of small, crusted papules with the hair matted to them. On the outer aspect of the left lower leg, near the malleolus, was a circular, punched-out ulcer, about 2 cm. in diameter, rather shallow, with a sluggish granulating base and surrounded by an area of redness about 1 cm. wide. These manifestations warranted a diagnosis of late or tertiary syphilis, and from the findings in the chest a tentative diagnosis of dextrocardia was made until confirmation could be obtained from x-ray examination.

The following day a fluoroscopic examination showed a pulsating shadow, corresponding in size to the normal heart shadow, on the right side of the chest. It showed the diaphragm moving evenly on both sides, and slightly higher on the left. Both chests were clear and showed no signs of fluid, masses, or adhesions to distort the position of the heart. Stereoscopic plates of the chest taken at this time and examined later confirmed the above findings. A barium meal was given and immediate pictures showed the stomach shadow located on the right side of the abdomen, and a picture taken at the time of giving a barium enema showed the tube pointing upwards on the right side, and the shadow of the barium

in the sigmoid flexure and descending colon on the right side. By means of the fluoroscope, during the process of giving the enema, the filling of the descending and the transverse colons was observed. The pictures taken 24 hours later showed the remains of the barium in the intestinal tract and confirmed the transposition of these organs.

The family history of the soldier was negative, and his only previous illnesses were measles, whooping cough, and mumps, which had occurred in childhood. An interesting fact, in view of his present condition, developed in questioning the patient, namely the fact that he was born with a right clubfoot. This had been operated on at the age of two or three years, to the best of his knowledge, and he remembers wearing a brace for some time, but thinks that it was discontinued before he went to school.

No history of syphilitic infection could be obtained, and no secondary manifestations had ever occurred, according to his statement. The ulcer on his leg had been present for six weeks, and he remembered no injury to that place. The eruption had appeared a little later. He did have a rather marked general glandular enlargement, and on the bridge of his nose, left arm, and chest were scars, small, depressed, grouped, with surrounding pigmented areas, suggesting previous lesions of luetic origin. His story about these was very vague and unsatisfactory. There were no scars or pigmented areas on his penis. His pupils were equal and reacted to light and distance. There was no Romberg, and his knee jerks and plantar reflexes were normal. His urine was normal, and a blood Wassermann gave a 2 plus reaction (army scale).

Further inquiry elicited the fact that he had been in the Army since August, 1918, a period of about 4½ months, during which time he had been subjected to the usual examinations and inspections. Previous to that time, for a period of fourteen years, he had followed the trade of a wood-worker. He had gone through school and business college, indulged in sports and games, and then followed his trade, including some fairly heavy work, without any discomfort or circulatory disturbance whatever. In fact, he did not realize that he was built any differently than the average individual, and had suffered no inconvenience from the condition.

His lesions healed in about three weeks under intensive treatment with arsphenamine and mercury, leaving some pigmentation. Later he was discharged from the service on a certificate of disability because of tertiary syphilis.

SUMMARY.

A case of complete congenital transposition of viscera, functionating perfectly, unrecognized up to the present time, associated with tertiary syphilis having no history of previous symptoms.

Book Reviews.

The Surgical Clinics of Chicago. February, 1919. Volume 3, Number 1. With 75 Illustrations. Published Bi-monthly. Philadelphia and London: W. B. Saunders Company. 1919.

This is an unusually interesting number.

Dr. Carl Beck contributes three cases of Facial Plastic: Dr. Frank Edward Simpson, "Radium in Malignant Diseases; demonstration of Three Patients Treated With Radium:" Dr. John R. Hargar, "Sarcoma of the liver in a Child of Seventeen Months; Sarcoma of Testicle, with Metastases in the Lung Simulating Tuberculosis:" Dr. Gustav Kolischer and Dr. J. S. Eisenstaedt report five Genito-Urinary cases: Dr. Charles Morgan McKenna, three Genito-Urinary cases: Dr. Maximilian J. Hubeny, "Roentgenologic Demonstration of Several Unusual Conditions of the Genito-Urinary Tract:" Dr. George E. Shambaugh, "Diagnosis and Treatment of Certain Otolaryngologic Conditions:" Dr. Edward H. Ochsner, "Three Cases of Sinus Disease:" Dr. Edward Louis Moorhead, a report of four interesting cases: Dr. Daniel A. Orth, "Strangulated Femoral Hernia Operated under Spinal Anesthesia:" Dr. Thomas J. Watkins, an interesting case of "Post-Operative Catheter Cystitis:" Dr. A. J. Ochsner, "Hypospadias, Excision of Ganglion from Hand:" Dr. Maurice A. Bernstein, "Talipes Cavus (Talipes Plantaris, Contracted or Hollow Foot)."

Major Speed describes vividly some of his work at the Evacuation Hospital and gives interesting general facts considering his experiences in war surgery; Lieutenant-Colonel Fred erick A. Besley also writes from France and describes his methods of transfusion in secondary hemorrhage; Dr. Victor D. Lespinasse gives in detail methods employed by him in transfusion. It is to be noticed that Dr. Arthur Dean Bevan does a side to side anastomosis after resection of the ileum, and advocates it as against the end to end anastomosis; this is surprising, coming from a surgeon of Dr. Bevan's ability.

The book is as usual very well illustrated.

Physiology for Nurses. By WILLIAM GAY CHRISTIAN, M.D., and CHARLES C. HASKELL, M.A., M.D.
Hygiene for Nurses. By NOLIE MUMEY, M.D.
Nursing in Diseases of Children. By CARL G. LEO-WOLF, M.D.
St. Louis: Mosby Company. 1918.

Three books have been published lately which will be found unusually valuable to members of the nursing profession. They have been written particularly for the nurse for the purpose of developing her powers of observation and enabling her to meet many of the problems which arise in her work.

Physiology for Nurses is an elementary textbook. As some knowledge of anatomy, physics, and chemistry is assumed by the author, full explanation has not been given of the technical terms employed. This book is clearly arranged, expressed concisely, and well illustrated.

The subject of hygiene is considered in *Hygiene for Nurses.* The purpose of the book is to present the most important facts without burdening the nurse with statistics. Eugenics, pregnancy, the causes and transmission of disease, immunity, food, and disinfection are some of the subjects discussed. The systematic arrangement of this book and more than seventy illustrations make it particularly valuable for the pupil nurse.

Among the most useful and practical textbooks for nurses is *Nursing in Diseases of Children.* As diagnosis and treatment are considered the province of the physician rather than of the nurse, reference to these subjects is omitted. This volume considers the physiology of the child, the problems of clothing and feeding, the cause of disturbances of nutrition, diseases caused by abnormal metabolism, methods of examining children, public health nursing, and mental hygiene. This book contains more than seventy charts and illustrations.

A Laboratory Manual for Elementary Zoölogy By L. H. HYMAN. Chicago: The University of Chicago Press. 1919.

This volume, prepared for a class in the University of Chicago, presents a detailed outline of elementary zoölogy. The book includes various general directions, including instructions in the use of the microscope, which will be found

helpful by the beginner. The author believes it to be more satisfactory to begin the course with the dissection of the complex animal, rather than to start with the lower vertebrates whose simplicity is not appreciated unless it can be compared with the higher animal forms. The main part of the book, therefore, is devoted to the anatomy of the frog. A general survey of the frog describes methods of killing the animal, its external anatomy, and general internal structure. The functions of the nervous, muscular, digestive, respiratory, excretory, circulatory, and reproductive systems are considered, and their anatomy studied in detail. Sections dealing with general histology describe the cells and tissues, and the structure of various organs. Of considerable interest are the chapters on the process of cell division, general embryology, and heredity. In addition to the detailed manner in which the subject is presented, suggested exercises and the instructions offered in carrying out experiments are particularly helpful. In the second part of the book are considered the simpler animal forms, including protozoa, coelenterata, platyhelminthes, annelida, and arthropoda, thus adding material to cover a complete course in elementary zoölogy.

The Soul in Suffering. By ROBERT S. CARROLL. New York: The Macmillan Company. 1919.

It is the privilege of physicians to come into close contact with the needs, both physical and spiritual, of their patients, and there are occasions when a sympathetic understanding of the mind and spirit can effect more good than attention to bodily ills. It is the purpose of this volume, *The Soul in Suffering*, to call to the attention of the medical profession the practical benefits which may result from a close relation between medical science and religious aspiration. The author traces the spiritual evolution of man, from the religion of fear and gloom to one of love and joy, together with the forward steps taken by medical science, and analyzes the vital elements in both lines of progress.

Physically, man needs wholesome food, fresh air, and hard work, to ensure good physique. Mentally, he should cease to confuse selfishness with suffering. As for the maintenance of bodily health, a balance between food and physical exercise is necessary; so to prevent illness of soul, the author believes that there must be adopted an attitude toward life which will make of suffering not a master but a test of growth. Great artists of the past, of whom Beethoven, Chopin, and Keats are notable examples, though suffering physically, yet developed a spiritual power which has brought cheer and comfort to generations of sufferers. The author of this volume explains that by the application of both medical science and religious aspiration to the problems of human existence, may be demonstrated the law of healing, the restoration of harmony between man and physical, mental, and spiritual forces.

Electricity in Medicine. By GEORGE W. JACOBY, M.D., and J. RALPH JACOBY, A.B., M.D. Philadelphia: P. Blakiston's Sons & Co. 1919.

Electricity has acquired an increased importance in many fields including medicine, during recent years. The use of electricity for therapeutic purposes must be based upon a thorough knowledge of the fundamental laws of electric phenomena. This volume, *Electricity in Medicine*, attempts to explain these fundamental laws, and to make clear the possibilities in utilizing electricity successfully as a remedial agent. The book is based on a work published in 1901 for the System of Physiologic Therapeutics; but it has been entirely rewritten in accordance with the changes which have taken place up to the present time. Electric phenomena are explained by the electron theory, and both the old and the new forms of current and modes of deriving them are explained. Nearly all references to electricity in surgery, x-rays, and phototherapy, have been omitted, since it is considered that these subjects merit separate consideration.

The book is divided into six parts. The first deals with the fundamental laws of electrophysics, and explains frictional and dynamic electricity, the physical, chemical, and physiologic effects of electric current, and various methods of obtaining and altering electromotive force. Part II describes the apparatus required for the therapeutic and diagnostic use of electricity. Electrophysiology and electropothology —are the subject matter of Part III, which discusses the physical comportment of the electric current in the human body, the electrophysiology and electropathology of motor nerves and muscles, and of the sensory, vasomotor, and secretory nerves. Part III considers the principles of electrodiagnosis and electroprognosis. In Part IV, the theoretic basis of electrotherapy is presented, and general methods and effects of the application of various forms of current are considered. In the last section of the book, the subject is treated in a more specialized way, and methods are suggested for applying electrotherapy in diseases of the motor or sensory nerves, the muscles, the nervous system, the articular and osseous system, the alimentary canal, to diseases of metabolism, of the circulatory and respiratory apparatus, of the uro- genital apparatus, and to the eye, ear, skin, and teeth. This work contains over two hundred and sixty illustrations, and is a thorough exposition of the use of electricity in medicine.

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ACTIVITIES OF A MEDICAL COLLEGE.

The services rendered during the war by medical schools all over the country have deepened our consciousness of the magnitude of the work of the medical profession and of new hope and promise for the future. In an address of welcome delivered by Dr. Graham Lusk to the students of Cornell University Medical College, the unselfish achievement of this institution has been outlined.

A year ago, the college was opened with a feeling of sadness, caused by the shadow which had been cast over the world by the Great War, in which Cornell was actively participating. One faculty member gave up his practice and went to Washington to control important matters there. In 1914, Dr. Stimson left the college to serve in the front trenches with the Belgians, and demonstrated by candlelight antiseptic methods for the treatment of wounds. One professor directed the New York Hospital Unit to France; another had charge of all the pathological laboratories in France. A third was chosen to standardize surgical dressings for the American Red Cross, and also trained one hundred and thirty-five army surgeons in the surgery of war wounds; he finally reached the front in France, and although suffering from an injury which caused him pain at every step, he advanced for many miles with our armies. The mental hardship to the man who stayed at home was commented upon by Dr. Lusk, who quoted as an example of the sacrifice made by some of these men the case of one professor who, while staying behind in order that the important work might be continued at home, nearly lost his life in conducting gas experiments for the government.

Among its many contributions, the Cornell Medical College may claim the distinction of having constructed the first portable x-ray apparatus for use in the field. Four hundred and twenty-nine men were trained in roentgenology in this institution. One professor, by special knowledge gained in Bellevue Hospital, was able so to perfect the ventilation system in the submarine that one of our boats remained submerged for four days, a world record. The scientific supervisor of the nutrition of the United States Army was sent from Cornell Medical College. Another sent from this institution distributed a million dollars' worth of food among the Serbians and left that country with ninety per cent. of the fields planted. Some of the students entered the regular fighting forces.

Dr. Lusk thus outlined briefly some of the war activities connected with Cornell Medical College. Individual sacrifice has been great, achievement notable. But not with the ceasing of hostilities have professors ceased to make personal sacrifices for the sake of the medical profession and humanity; for "they are in this work of teaching, not for financial reward, but in spite of the lack of it." The salaries of professors have not been increased during the war; yet the professors do not strike, but remain at their posts and support the progress of great experiments unselfishly. It is to a medical school conducted in this spirit, willing and eager to render the deepest devotion to the medical profession, that Dr. Lusk welcomed the new students of medicine to the Cornell Medical College.

DR. SHATTUCK ASSUMES RED CROSS POST.

DR. GEORGE C. SHATTUCK, after repeated delays due to the longshoregentlemen's strike, has finally sailed to assume his duties at Geneva as Secretary to the Central Medical Bureau of the League of the Red Cross Societies, of which Dr. Richard P. Strong is Director.

Dr. Shattuck worked on tropical ulcer in the government laboratories in Manila, contributing a paper thereupon to the International Dermatological Congress held in New York under the presidency of the late James C. White in 1907. This paper was published in the Transactions of that Congress, and in the *Philippine Journal of Science*, 1907, Vol. II., page 551.

Dr. Shattuck was a member of the Serbian typhus expedition headed by Dr. Strong in 1915, and received the Order of St. Saba. In 1916 he served a term in the Harvard Unit in France with Dr. Hugh Cabot, and returned with him in February, 1917, to the Unit with a commission as Major in the R. A. M. C., engaging for the duration of the war. He returned with the Unit after its discharge in January, 1919. He was one of the eight Harvard men to receive the Honorary A. M. at Commencement, 1919, and later received the British D. S. O.

MEDICAL NOTES.

INVESTIGATION OF INFLUENZA.—The Metropolitan Life Insurance Company has provided resources to carry on investigations into the cause, mode of transmission and treatment of influenza and its complications.

A commission has been appointed consisting of Dr. G. W. McCoy, Director of the Hygienic Laboratory, U. S. Public Health Service; Dr. W. H. Park, Director of the Research Laboratory, New York City Department of Health; Dr. Lee K. Frankel, 3rd Vice-President of the Metropolitan Life Insurance Company; Dr. A. S. Knight, Medical Director of the Metropolitan Life Insurance Company; Dr. M. J. Rosenau, Chairman, Professor of Preventive Medicine and Hygiene, Harvard Medical School. Later, Professor E. O. Jordan, of the University of Chicago, and Dr. W. H. Frost, of the U. S. Public Health Service, were invited to join in the work.

Work has already been begun in Washington, New York, Boston, and Chicago, and may be extended to other places as occasion arises. In this way correlation and coöperation are affected. The object of the commission is primarily to study the cause, mode of spread and treatment of influenza and its complications. Studies are now being made upon the prophylactic value of vaccines against influenza, common colds and pneumonia, properly controlled. Laboratory researches are being conducted to determine the cause of these infections, and a special study is being made of the bacterial flora of the upper respiratory tract in health and disease. Special consideration is being given to the possibility of a filterable virus being the cause of any of these infections.

Coöperation and suggestions have been invited from health officers and others interested.

NEW YORK AND NEW ENGLAND ASSOCIATION OF RAILWAY SURGEONS.—The twenty-ninth annual session of this association was held at the Hotel McAlpin, New York City, on October 20, under the presidency of Dr. J. S. Hill of Bellows Falls, Vt.

The attendance was far above the average and Dr. George Chaffee, the corresponding secretary, reports this meeting to have been one of the very best in the history of the Association.

Officers elected for the ensuing year are as follows: President, Dr. Wm. B. Coley, New York City; first vice-president, Dr. J. F. Black, White Plains, N. Y.; second vice-president, Dr. Donald Guthrie, Sayre, Pa.; treasurer, Dr. James M. Hamilton, Rutland, Vt.; corresponding secretary, Dr. George Chaffee, 100 Hawley street, Binghamton, N. Y.; recording secretary, Dr. J. H. Reid, Troy, N. Y.

The following addresses were given at the morning session:

A Case Record of an Infection, by Dr. J. F. Black; Modern Methods Employed in the Treatment of Gas Bacillus Infection, by Dr. Donald Guthrie; Treatment of Crushed Extremities, by Dr. W. L. Estes; The Importance of the Preparation of the Autogenous Bone Graft, and Its Application to Its New Environments, by Dr. Charles Geiger. An address was also delivered by the president, Dr. J. S. Hill.

At the afternoon session, in addition to an address on surgery, the following subjects were discussed:

A Brief Summary of 368 Cases of Bone

Tumor, Especially in Relation to Trauma and Early Diagnosis, by Dr. Joseph C. Bloodgood; Exhibition of Patients Showing the Value of Conservative Treatment of Sarcoma of the Long Bones, by Dr. William B. Coley; Unusual and Interesting Fractures and Dislocations, by Dr. C. W. Hopkins; Safety, First-Aid, and Workmen's Compensation, by F. V. Whiting; With the Armies in the Field, by Commander William A. Bainbridge, M. C., U. S. Navy, R. F.

SERUM AGAINST YELLOW FEVER.—It has been reported to the Navy Department from the medical officer of the American cruiser *Chicago* that during an outbreak of yellow fever at Amapala, Honduras, the anti-yellow fever serum discovered by Dr. Noguchi, a Japanese investigator, has been used successfully.

AMERICAN MEMORIAL HOSPITAL FUND.—Contributions to the New England branch of the French Wounded Fund, for the American Memorial Hospital, have reached the sum of $236,159.22.

BOSTON AND MASSACHUSETTS.

THE WEEK'S DEATH RATE IN BOSTON.—During the week ending November 8, 1919, the number of deaths reported was 186 against 264 last year, with a rate of 12.18 against 17.55 last year. There were 36 deaths under one year of age against 36 last year.

The number of cases of principal reportable diseases were: Diphtheria, 70; scarlet fever, 57; measles, 102; whooping cough, 30; typhoid fever, 1; tuberculosis, 37.

Included in the above were the following cases of non-residents: Diphtheria, 5; scarlet fever, 6; tuberculosis, 5.

Total deaths from these diseases were: Diphtheria, 2; measles, 1; whooping cough, 1; tuberculosis, 16.

Included in the above were the following non-residents: Diphtheria, 1; tuberculosis, 1.

Influenza cases, 8; influenza deaths, 1. Last year: Influenza cases, 72; influenza deaths, 55;

HAMPDEN DISTRICT MEDICAL SOCIETY.—The regular fall meeting was held at the Hotel Worthy, Springfield, on Tuesday afternoon, October 28, 1919. There was a large attendance and personal experiences of medical interest in the war were related by Drs. J. M. Birnie, C. F. Lynch, W. A. R. Chapin, G. H. Burke, P. M. Cort, W. R. Weiser, W. P. Ryan, G. D. Henderson, H. C. Martin, and others.

Obituary.

HENRY KEMBLE OLIVER, M.D.

DR. OLIVER, who died at Boston on October 25, on the eve of his ninetieth birthday, was one of the few remaining members of a generation of Boston physicians which has now nearly passed away.

He came from the oldest of New England stock, being a lineal descendant in the eighth generation from Thomas Oliver, surgeon, who with wife and eight children came from Bristol, England, in the ship "Lion," landing at Boston January 5, 1632, and who was one of the founders of the First Church (the "Westminster Abbey" of Boston) and its ruling elder.

He was born in Salem, the son of General Henry K. Oliver and one of a family of seven children.

His father was a man of unusual and varied talents. A graduate of both Harvard and Dartmouth, at the age of eighteen he began life as a school master, which calling he followed for twenty-five years. Subsequently serving as Adjutant-General of the State of Massachusetts, superintendent of the Atlantic Cotton Mills, and later still, treasurer of the State during the Civil War period, he finally became mayor of Salem. A man of musical talent, he was the author of numerous hymns, one of which, "Federal Street," is widely known to this day. At the time of his death he was known as the foremost citizen of Salem.

With such a sire it is no wonder that the son should take a serious and ambitious view of life, one filled with purpose, to make himself a useful citizen. Dr. Oliver graduated from Harvard in the class of 1852, Dr. David W. Cheever and the Hon. Joseph H. Choate both being members of this class, which now has but three surviving members, George Augustus Peabody, Judge William G. Choate, and Peter C. Brooks. After graduating in 1855 from the Harvard Medical School he went to Europe to complete his medical education. He was one of the pioneers

who "discovered" Vienna as a medical centre, as Paris had been to the previous generation. The early development of the specialties of medicine appears to have been the strong attraction, for we find Oliver bringing home with him a laryngoscope and exhibiting it with much éclat to his professional elders. His classmates, Derby, Jeffries, Sprague, and White, brought back with them the last words in ophthalmology and dermatology. These members of what afterwards was known as the "Vienna Club" set an example which was followed by at least two generations of American medical students. Dr. Oliver did not establish himself at first as a pure specialist, the time (1860) had hardly come for that, but began general practice in Boston at 10 Joy street. This he relinquished temporarily in 1861 to accept the offer of Rev. Henry W. Bellows of the United States Sanitary Commission, of a position as medical inspector of camps in McClellan's Army, then encamped in front of Washington.

In 1868 he was appointed one of the visiting physicians at the Massachusetts General Hospital and in addition to his general practice he had meanwhile built up a specialty of diseases of the throat and at one time he was lecturer on this subject at the Harvard Medical School. Some of his early instruments are preserved in the collection of the Laryngological Department of the Massachusetts General Hospital. A number of these instruments bore his name.

Dr. Oliver had charge of the late Gardner Brewer, a prominent citizen of Boston, at the time of his death from a malignant disease. Mr. Brewer's daughter, the late Mrs. Arthur Croft, was impelled by this experience to set aside the sum of one hundred thousand dollars for the study of cancer. Dr. Oliver was appointed by Mrs. Croft to take charge of these investigations and in 1880 gave up practice, making frequent visits to Europe to familiarize himself with the latest researches on the origin and treatment of this disease. In 1899, on the death of Mrs. Croft, this sum was placed in charge of Doctors H. K. Oliver and J. Collins Warren as trustees, to continue these studies. This fund was now placed by them in the hands of the Corporation of Harvard College and the "Harvard Cancer Commission" was formed, Dr. Oliver becoming a member of the Commission and serving in that capacity until the time of his death.

While still a student in college he recognized the importance of a competent and sympathetic medical adviser for the undergraduate, a need which was brought home to him by personal experience at that time. The train of thought thus engendered was doubtless sufficiently vivid to remain through middle life and to crystallize gradually into the purpose of the admirable foundation with which his name in future will be connected.

The new department of hygiene, which has been in operation for several years under Dr. Roger Irving Lee as its first professor, was made possible by the gift of Dr. Oliver, who may now be reckoned as one of Harvard's largest benefactors. The fund, which has been added to from time to time, now amounts to several hundred thousand dollars, a sum ample enough to carry out the purposes of the founder. This new department, while in no way conflicting with the responsibilities of the regular college physician, will develop a plan for the physical welfare of the student body of the university on a more comprehensive scale than has ever before been attempted. The physical examination of all students entering college and the system of universal physical training are some of the first fruits of this admirable gift. Dr. Lee's book on "Health and Disease, Their Determining Factors," and dedicated to the unknown benefactor of Harvard, is another valuable product of this foundation.

As designed, and as being carried out, the Henry K. Oliver Foundation is bound to have a far reaching effect upon the physical condition of the young men who come to the university and to place the training of the body more nearly upon the appropriate relation to the training of the mind than has ever before been attempted.

In 1918 Dr. Oliver's sight began to fail owing to the development of cataract in both eyes. An operation in one eye gave temporary relief but left him dependent upon the services of a nurse and attendant. During the past year he had been almost totally blind. This affliction he bore absolutely without complaint and continued to maintain his interest in his plan of service to the university which was gradually unfolding itself.

His general health had continued good in spite of his advanced years and the end came swiftly at the close of a day which had given no sign.

Dr. Oliver is survived by two sisters, Mrs. George L. Andrews of Washington, D. C., and Mrs. Charles G. Cheever of North Andover.

He will be remembered by his professional colleagues in his early career as a pioneer in this country in the treatment of diseases of the throat and in his closing years as a benefactor of a new department in university life designed for student welfare. J. C. W.

AUGUST HOCH, M.D.

Dr. August Hoch, of late years a resident of Montecito, Calif., distinguished as a psychiatrist, died in San Francisco from nephritis September 25, 1919. Dr. Hoch came to this country for his medical training from Basle, Switzerland, where he was born in 1868. He was graduated at the University of Maryland in 1890 and later studied at the Johns Hopkins University and abroad. He returned again to the United States and undertook as his first work the foundation of a laboratory at McLean Hospital in Boston.

He was particularly versed in neuropathology and also in certain of the newer psychological methods then coming particularly into vogue. Later he served as assistant physician at the Bloomingdale Hospital at White Plains, N. Y., and still later succeeded Dr. Adolf Meyer as Director of the Psychiatric Institute at Ward's Island, New York, and became Professor of Psychiatry at Cornell University Medical School. This was a period of great and productive activity, but unfortunately his health necessitated a change of climate and he went to California in 1917, in the meantime continuing his literary work.

He was particularly interested in the development of the *New York Psychiatric Bulletin* and also was on the medical staff of other journals relating to his chosen subject. On the foundation of the *Archives of Neurology and Psychiatry*, published by the American Medical Association, he was made one of its editorial board. He was a member of the American Neurological Association, the American Medical Association and various societies dealing with his special field. His publications were not particularly numerous but all showed much care in preparation and offered invariably material and viewpoints which were of distinct value. Some of the more important of his papers were "A Study of Some Cases of Delirium Produced by Drugs," 1906; "The Psychogenic Factors in the Development of Psychoses," 1907; "Constitutional Factors in the Dementia Praecox Group," 1910; "On Some of the Mental Mechanisms in Dementia Praecox," 1911; "Personality and Psychosis," 1911; "The Dementia of Cerebral Arteriosclerosis," 1916. His latest paper was "A Clinical Study of Psychoses Characterized by Distressed Perplexity," which he wrote in conjunction with Dr. Kirby.

Dr. Hoch represented the very best in psychiatric advance in the past two decades. His mind was entirely open to new ideas and he took an extremely friendly attitude toward the psychoanalytic movement in spite of the violent opposition of many of his colleagues. In this he showed his real catholicity of spirit and the admirable balance of his judgment. He recognized distinctly the value of this newer psychology and yet was entirely capable of fitting it into the scheme of knowledge already attained without undue emphasis. It is altogether unfortunate that his death occurred at so relatively early an age, particularly since he had much work in contemplation and was never more enthusiastic in his endeavor to upbuild psychiatry in its broadest aspects.

He had a peculiarly charming personality. Those who knew him well felt always his kindliness of spirit, his keen sense of humor, his admirable good fellowship and his high aspiration for all that was best, not only in his profession but also in life at large.

He married abroad and his wife and one daughter survive him.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA.—It has been announced that in the medical department of the University of Pennsylvania, Dr. William H. F. Addison has been made a full professor of histology and embryology; Dr. Oscar H. Plant has been promoted to a full professorship in pharmacology; and Dr. Byron M. Hendricks and Raymond Stehle have been appointed assistant professors of physiologic chemistry.

Correspondence.

SUCCESSFUL RESECTION OF THE INTESTINE IN 1826.

Mr. Editor:—

While looking up another subject the other day, I came across the report of a case in the *Boston Medical Intelligencer* for January 17, 1826. It struck me as worthy of resurrection, and I therefore copied it out.

"A surgical operation of rare occurrence was recently performed in Ravenna, Portage County, Ohio, by Dr. Joseph De Wolf, on a certain McLaughlin of that town."

"The patient had, for a number of years, been afflicted with inguinal hernia

"On the 17th day of September, in consequence of neglect, it became strangulated and subsequently strictured.....surgical aid was then called in, but it was too late to replace the intestine, and every attempt to reduce the inflammation proved unsuccessful.

"As the only means of saving the life of the patient an operation was determined on. The abdomen was opened in the umbilical region and, the intestine being found mortified to the extent of eight inches, it was found necessary to *remove* the diseased part together with the mesentery connected with it—an operation extremely hazardous and which was rendered still more difficult in this case in consequence of the strong adhesion of the hernial sac to the muscle, and the necessity of dividing the mesenteric artery.

"The ends of the intestine were then brought together and secured by stitches and the external incision sewed up.

"Four weeks after the operation the patient, who is represented as a man of fifty-seven years of age and of intemperate habits, rode two miles and is now able to attend to his ordinary business."

Successful resection of the intestine in 1826, without anesthetics, without antiseptics, by a country surgeon (Ravenna had but 3000 inhabitants in 1910) is certainly worthy of record. I should like to know more of this Dr. De Wolf.

Very truly,

S. B. WOODWARD.

BOYLSTON MEDICAL PRIZES.

These prizes, which are *open to public competition*, are offered for the best dissertation on questions in medical science proposed by the Boylston Medical Committee.

At the annual meeting held in Boston in 1916 a prize of three hundred dollars was awarded to an essay entitled "Studies of the Streptococcus of Smith," by Wilson G. Smillie, M.D., Cambridge, Mass.

For 1919 there is offered a prize of three hundred dollars and the Boylston Prize Medal, for the best dissertation on the results of original research in medicine, the subject to be chosen by the writer. The Boylston Prize Medal will be added to the money prize only in case the winning essay shows special originality in the investigations detailed.

Dissertations entered for prizes must be in the hands of the Secretary, H. C. ERNST, M.D., Harvard Medical School, Boston, Mass., on or before December 31, 1919.

In awarding these prizes, preference will be given to dissertations which exhibit original work, but if no dissertation is considered worthy of a prize, the award may be withheld.

Each dissertation must bear, in place of the author's name, some sentence or device, and must be accompanied by a sealed packet, bearing the same sentence or device, and containing the author's name and residence within.

Any clew by which the authorship of a dissertation is made known to the Committee will debar such dissertation from competition.

Dissertations must be printed or typewritten, and their pages must be bound in book form.

All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within *one year* after they have been received.

By an order adopted in 1826, the Secretary was directed to publish annually the following votes:—

1. That the Board does not consider itself as approving the doctrines contained in any of the dissertations to which premiums may be adjudged.
2. That, in case of publication of a successful dissertation, the author be considered as bound to print the above vote in connection therewith.

The Boylston Medical Committee is appointed by the President and Fellows of Harvard College, and consists of the following physicians: William F. Whitney, M.D., Chairman; Harold C. Ernst, M.D., Secretary; William T. Porter, M.D., Edward H. Nichols, M.D., Reid Hunt, M.D., Henry A. Christian, M.D., John Warren, M.D.

The address of the Secretary of the Boylston Medical Committee is Harold C. Ernst, M.D., Harvard Medical School, Boston, Mass.

SOCIETY NOTICE.

HARVARD MEDICAL SOCIETY.—Next meeting in the Peter Bent Brigham Hospital Amphitheatre (Van Dyke Street entrance), Tuesday evening, December 2, at 8.15 P.M.

PROGRAM.

1. Clinical Demonstrations.
2. Dr. W. T. Councilman, "The Historical Development of Modern Conceptions of Tuberculosis."

Medical students and physicians are cordially invited to attend. ELLIOTT C. CUTLER, *Secretary.*

RECENT DEATHS.

DR. GEORGE H. PAYNE died suddenly at his home in Boston, on September 29, at the age of 51 years. At the time of his death, Dr. Payne was on service with the First Motor Corps, Massachusetts State Guard, serving as dental first lieutenant. He was born in Greenfield, Massachusetts. He was a graduate of the Tufts Dental School and for a number of years he was associated in practice with Dr. Eugene H. Smith, Dean of the Harvard Dental School. For the last fifteen years he had been practicing in Boston. Dr. Payne was Secretary of the State Board of Registration in Dentistry. In 1893 Dr. Payne married Miss Bertha Luce of Boston. His widow, his mother, and a brother survive him. He was a charming and lovable man, and his sad death is a tragedy to all his friends.

FRANCIS CHARLES MURPHY, M.D., died suddenly while visiting a patient in Roxbury, November 2, 1919, aged 60. Dr. Murphy was graduated from Harvard Medical School in 1886, lived in the Back Bay, Boston, and practised in Roxbury. He was a Fellow of the Massachusetts Medical Society.

CORRECTION IN LIST OF PHYSICIANS IN SERVICE.

IT has been called to our attention that Dr. J. J. Condrick of Brockton was listed in the August 7, 1919, issue of the JOURNAL as having been recommended for a commission but not called to the Service. Dr. Condrick was in active service at Camp Devens, and was honorably discharged December 6, 1918.